

## **D. SOLID WASTE AND RECYCLING FACILITIES - CROSS MEDIA ISSUES**

### **D.1. Guidance for Class B Recycling Facilities**

Class B Recycling facilities primarily process demolition wastes, such as concrete, asphalt, and brick, scrap tires, tree parts, and petroleum contaminated soils. During the processing of all of these materials, there exists the potential for particulate emissions from the source, such as a concrete crusher or conveyor, from storage, such as soil piles, and from the movement of the material on-site by truck traffic. In New Jersey, there have been instances of visible particulate emissions from Class B Recycling facilities, as well as other facilities where similar processing of materials is performed. Such instances create the potential for violations of the facility's Air Pollution Control Permit as well as creating a nuisance off-site. Of a particular concern are the emissions of PM-10 particulate which include all particulate matter having an aerodynamic diameter less than or equal to a nominal 10 micrometers. Inhalation of PM-10 has the potential to accumulate in the lungs.

The emissions of volatile organic compounds (VOC), such as benzene, and heavy metals, such as lead and arsenic, in addition to particulate emissions, are a concern at facilities that process petroleum contaminated soils. Emissions of heavy metals are minimized with good particulate control and limits on the heavy metal concentrations in the contaminated soils accepted at the facility. VOC emissions can be minimized through proper handling procedures and APC controls, such as thermal oxidization and activated carbon adsorption, on the discharge stacks from the source operation.

To minimize the impact of the air contaminants from Class B Recycling facilities, the Department anticipates incorporating the following air contaminant control measures. These measures, as appropriate, will be required through modification to the New Jersey Administrative Code, or through inclusion in APC Permits.

#### **Dust Management Plan**

A Dust Management Plan (DMP) should be developed to address fugitive emissions. The plan must include the following: 1. Procedures for visual inspections of material handling and process equipment; 2. Dust management procedures; 3. Corrective actions; and 4. a checklist of sources and areas to be checked for visible emissions and accumulations of dusty material in open area (other than storage piles). The DMP is subject to the review and approval of the Department and should contain, at a minimum, the following sections: General Overview of Operations (Site Description, Description of Operations), Dust Emission Sources, Best Available Control Measures (e.g. Employee Training, Good Housekeeping Practices, Periodic Inspection Program, Corrective Action Procedures, Recordkeeping), DMP Schedule for Implementation and Reporting.

## Pile Covers

All inactive processed and unprocessed soil piles that are not within an enclosure should be covered with a tarpaulin panel with a 16 mil woven polyethylene fabric or equivalent. The tarpaulin panel should be white to reflect the rays of the sun and retard evaporation of organic matter to the air.

## Soil Processing Operations

There are various methodologies employed to process contaminated soil. Contaminants include volatile organic compounds and heavy metals, such as lead, mercury, and arsenic. It is suggested all soil processing operations be enclosed, with a sufficient draft drawn on the process to capture all emissions, and that all emissions be vented to the appropriate Air Pollution Control (APC) equipment. The following are examples of soil processing operations that are currently taking place or have taken place in New Jersey.

### Thermal Treatment of Soils

Three stationary commercial treatment facilities and several site remediation locations have employed thermal treatment. The thermal treatment is typically done in a rotary kiln unit. The unit is controlled with, at a minimum, volatile organic compound (VOC) and particulate air pollution control devices. Since the unit must be operated under negative draft, the only air contaminant emissions are those exiting the stack of the equipment.

### Biological Degradation as a Treatment Methodology

One commercial soil treatment facility employs aerobic degradation to remediate the VOC contamination. This occurs in a building which is vented to a particulate control device followed in series by a VOC control device.

### Soil Stabilization

One site remediation facility in New Jersey employed a pugmill, in which contaminated soils were mixed with cement to stabilize the heavy metals and increase the bearing capacity of the soil. This pugmill was maintained under negative pressure and vented to a particulate control device followed in series by a VOC control device.

## Water Sprays

Water sprays should be available to prevent and address the generation of fugitive emissions.

## Conveyors

Conveyors should be covered at a minimum. A determination should be made based on the potential to emit as to whether the conveyor should be vented to any APC devices.

## Truck Traffic

Actions should be taken to prevent and minimize fugitive emissions from the movement of trucks, possibly including the following: sufficient water should be applied to paved and, especially unpaved roads, trucks should be covered with a plastic tarp when not loading or unloading materials, and truck wheels should be washed down on an appropriate basis.

## Weather Conditions

In the facility-operating plan, provisions should be included which would halt processing and movement of materials if weather conditions, such as excessive wind or heat, would result in visible fugitive emissions occurring.

## Need for Air Pollution Control Permits and Certificates

The types of equipment which require APC Permits and Certificates are listed in N.J.A.C. 7:27-8.2 "Applicability".

## **D.2. Guidance for Transfer Stations**

Transfer Stations are solid waste facilities at which solid waste is transferred from one solid waste vehicle to another solid waste vehicle, including a rail car, for transportation to an off-site solid waste facility. During the transfer of waste, there exists the potential for odor or particulate emissions. If the emissions are not controlled and exceed regulatory parameters, they create the likelihood for violations of the facility's Air Pollution Control (APC) Permit as well as creating a nuisance off-site. Emissions to the atmosphere can be minimized through proper waste handling procedures (Good Solid Waste Handling Practices - GSWHP) and installation/operation of APC controls such as filters and activated carbon adsorption.

To minimize the impact of the air contaminants from Transfer Stations, the Department anticipates incorporating the following air contaminant control measures. These measures, as appropriate, will be required through modification to the New Jersey Administrative Code, or through inclusion in APC Permits.

A good Odor/Dust Management Plan (ODMP) addresses and minimize atmospheric emissions and off property effects. Facilities should follow Good Solid Waste Handling Practices (GSWHP) which include: 1. Procedures for visual inspections of material

handling and process equipment, 2. Odor and dust management procedures, 3. Corrective actions.

### Odor Related Emissions

Generally carbon based filters are the most common form of odor control that are used at Transfer Stations. These filters are a part of a three stage panel housing where the pre-filter and after-filter are used to remove particulate related emissions and are sandwiched with the carbon filter panels which knock-out and control odor related emissions.

The most common method of determining carbon breakthrough generally involves taking a sample of carbon and sending it out to a lab to determine saturation and remaining life.

Another method of monitoring for breakthrough involves using color cards (similar to a litmus test) where a change to a brownish color helps in determining the remaining life of the carbon. This method works well in a dry environment and has a tendency to give false results since its is sensitive to humid conditions where waste is very moist.

The frequency of monitoring for breakthrough is generally on a case-by-case basis depending on location and severity of odors. Monthly monitoring is very common however quarterly monitoring is not out of the question and is also used.

The use of carbon canisters is also another method for odor control but is not commonly used at transfer stations.

### Particulate Emissions

Generally Particulate Panel Filters are commonly used. They consist of a pre-filter and after-filter housing.

A pressure drop meter is used to monitor and determine how well the filters are working and if it is time to replace them. If pressure readings are within the manufacturers specified range, then filters are "doing their job".

Generally it is asked that the operators check the meters on a monthly basis. However, some install an alarm that gets triggered if the pressure readings are outside the range.

Baghouse and cyclones can also used to control particulate emissions.

A pressure drop meter is used to monitor. If pressure readings are within the manufacturers specified range, then the Baghouse or Cyclone is "doing the job".

Generally, it is asked that the operators check the meters on a monthly basis. However, some propose to install an alarm that gets triggered if the pressure readings are outside the range.

## Water Suppression

Using water misting to "wet down" garbage and prevent particulates from becoming airborne can also be used in addition to one of the above listed methods of controlling particulate emissions. Literature has shown that water suppression can be about 50% effective. However, water suppression cannot be used solely by itself as a primary method of particulate control. The biggest problem with this method is humidity related to the carbon media, which affects odor control

## Odor Neutralizing Agents

Odor neutralizing agents (deodorizers) are not allowed in lieu of air pollution control. The Department considers them to be air contaminants and not a solution.

## Truck Traffic

Actions should be taken to prevent and minimize fugitive emissions from the movement of trucks, possibly including the following: sufficient water should be applied to paved and, especially unpaved roads, trucks should be covered with a plastic tarp when not loading or unloading materials (if applicable), and truck wheels should be hosed down on an appropriate basis.

## Need for Air Pollution Control Permits and Certificates

The types of equipment which require APC Permits and Certificates are listed in N.J.A.C. 7:27-8.2 "Applicability".

### **D.3. Municipal Solid Waste and Regulation Medical Waste Incinerators, Iron and Steel Foundries and Mills - Mercury Emissions**

Mercury is a highly toxic heavy metal and bioaccumulative material. Its unique physical and chemical properties have led to its use in a wide variety of commercial and industrial applications. These uses, and long term combustion of various fuels have resulted in the global dispersion of mercury. The toxic mercury has been found at very high levels in all environmental media. The main concern is its impact on the human nervous system. Therefore, the Department created a Mercury Task Force in April 1992 to review and study sources of mercury pollution, its impact on health and ecosystem and to develop a mercury pollution reduction plan for the state of New Jersey.

As a result of the first task force recommendations accepted by NJDEP, standards for municipal solid waste incinerators (MSWI) were promulgated in 1994 at NJAC 7:27-27: Control and Prohibition of Mercury Emissions. All of New Jersey's MSWI have met the mercury standard although the two facilities with ESP control have exceeded the limits at times. Overall mercury emissions have been reduced by about 94% over the last eleven years.

On March 9, 1998, the Department established a second Mercury Pollution Task Force to develop and recommend a comprehensive mercury pollution reduction plan for the State of New Jersey, including recommendations on mercury emission controls and standards for all other sources. The Task Force was composed of representatives from various sectors, including academia, business and industry, utilities, environmental groups, and federal and local governments. The New Jersey Mercury Pollution Task Force reviewed mercury emissions data from over 30 source categories in New Jersey and developed recommendations for reducing mercury use and emissions. Based on the Task Force recommendations, the Department has begun the process to revise a section of the mercury emission regulations for municipal solid waste incinerators and propose mercury emissions limits for fossil fuel combustion, the iron and steel industry, and medical waste incinerators.

The Mercury Task Force recommended a strategic goal of an 85 percent decrease of in-state mercury emissions from 1990 to 2011. The Task Force has found that numerous actions are needed to achieve the New Jersey air emissions reduction milestones. These milestones are based on the Task Force's assessment that realistic reduction of mercury from various sources can be achieved in New Jersey.

Based on stack tests results, it is estimated that a total of approximately 1800 pounds per year of mercury is being emitted in New Jersey from the five municipal solid waste incinerator (MSWI) plants, up to seven medical waste incinerators, and six iron and steel manufacturing plants.

#### Municipal Solid Waste Incinerators

MSW is generated by residential, commercial and institutional sources within a community. MSW contains an estimated 2 ppm of mercury. The mercury content of municipal solid waste has declined in the last decade. This is due to virtual elimination of mercury in dry cell batteries, packaging, and other items required by the Dry Cell Battery Management Act, N.J.S.A., 13:1E-99.59 through 13:1E-99.81, and the Toxic Packaging Reduction Act, N.J.S.A. 13:1E-99.44 et seq.. Separation of mercury containing items from MSW has also reduced mercury in MSW.

When waste is incinerated, some of the mercury contained in the waste is released to the atmosphere. The high temperatures involved in the solid waste incineration process (in the range of 2000 o F) can be expected to vaporize virtually all of the mercury present in the waste. The best emission controls on New Jersey solid waste incinerators, which primarily consist of the injection of finely-divided carbon prior to fabric filters, remove 95% or more of the mercury from the combustion exhaust gas stream. The injected carbon is ultimately mixed with the ash. Work by the first New Jersey mercury task force indicates that mercury remains adsorbed on the injected carbon and that mercury releases from municipal solid waste combustion ash are low. Over the past decade, due to NJDEP requirements that were implemented as a result of the efforts of New Jersey's first Mercury Task Force, all MSW incinerators have installed the carbon injection emission controls.

New Jersey's five MSW incinerator facilities are required to report results of stack tests of the mercury concentration of the emitted gas stream on at least a yearly basis. These results are converted to pounds-per-year estimates of mercury emissions. These estimates provide evidence of a dramatic decline in mercury emissions over the past decade, as shown in Appendix Table D-1.

Additional source separation is one option for further reducing air emissions of mercury from MSW incinerators. Further steps could be taken to remove mercury-containing items, such as fluorescent tubes and thermostats from waste. A municipality, county or the state could ban certain mercury-containing products from disposal or determine them to be a mandatory recyclable material. Alternatively, waste containing mercury could be directed to a landfill, rather than to MSW incinerators. Unfortunately, due to recent court decisions related to State-mandated waste flow, New Jersey no longer has the degree of authority it once had over the flow of solid waste within its borders. A significant volume of solid waste destined for MSW incinerators is received from out-of-district and out-of-state sources. Given the economics of disposal, the importation of out-of-district waste may increase. Without effective waste flow control, a requirement that mercury-containing products should not be incinerated and should only be landfilled will be difficult to implement because New Jersey cannot require communities outside of the State to implement source separation practices.

N.J.A.C. 7:27-27 sets an interim mercury emission standard of 65 micrograms per dry standard cubic meter (ug/dscm) corrected to 7% oxygen to be met by the year 1996 and 28 ug/dscm to be achieved by the year 2000. The mercury emissions standard of 28 ug/dscm was set based on a presumption of at least 80% control with carbon injection and 80 % reduction with source separation/waste stream mercury reduction measures. For all MSWI's in New Jersey 80% reduction was set as an alternative limit in case source separation was not fully successful.

On November 7, 1994, these regulations were adopted and the resulting installation of air pollution control devices significantly reduced mercury emissions (reducing emissions from about 4,400 pounds per year (lbs/yr) to less than 300 lbs/yr). Since 1995, carbon injection systems have been operating on all thirteen units at all five resource recovery facilities in the State of New Jersey of the following counties:

1. CAMDEN
2. ESSEX
3. GLOUCESTER
4. UNION
5. WARREN

Mercury test data for carbon injection control technology on municipal solid waste combustors, after the control devices is summarized in Appendix table D-2. The system reduces mercury emissions from 80 to 98%, primarily depending on the particulate air pollution control device (electrostatic precipitator (ESP) or baghouse).

The current New Jersey rules require an emission standard of 28 micrograms per dry standard cubic meter (ug/dscm) or 80 percent emission reduction as an alternative standard. Testing over the last five years have demonstrated that carbon injection on MSW incinerators can consistently achieve over 95 percent mercury reduction with baghouse particulate collection and over 90 percent mercury reduction with electrostatic precipitator (ESP) particulate control. Based on the demonstrated success of carbon injection, the Department intends to revise the State's air pollution control regulation governing Municipal Solid Waste Incinerator (MSWI) emissions to include at least U.S. EPA's higher efficiency requirement for post-combustion emissions controls, thereby changing New Jersey's alternative limit based on efficiency from 80% to higher than 80%. The rate component of New Jersey's primary revised limit 28µg/dscm would remain more stringent than the federal limit. Efficiency limits of 90% and 95% are also being considered.

#### Stack Test Results

Testing is done on every unit for mercury levels in the stack gases and prior to carbon injection. Inlet mercury concentrations vary widely around a 300 ug/dscm average, which has dropped from an average of 700 ug/dscm in the early 1990's. Data shows better than expected performance for most of the facilities. All thirteen units are now achieving the existing 28 ug/dscm or 80% reduction mercury emission standard.

#### Medical Waste Incinerators

Medical waste, which includes infectious and non-infectious waste from medical and veterinary offices, clinics, and hospitals, is incinerated at up to 7 facilities in New Jersey, including hospitals and research facilities. Stack tests carried out pursuant to NJDEP permits indicate that the total emissions from these facilities are very low, in the range of 2 pounds per year.

Pollution prevention measures, including source reduction, re-use, recycling, and separation prior to incineration have been effective at controlling mercury from these facilities. These practices are currently being employed to a large degree, and this is a major reason emissions from this sector are so low in New Jersey. Mercury sources in medical waste could include batteries, fluorescent lamps, thermometers, plastic pigments, antiseptics, diuretics, infectious waste bag pigments and CAT scan paper.

Many previous sources have been closed due to more stringent air emission standards. The federal government has set a goal of reducing air emissions of mercury from this source by 90% by the year 2005.

There is no existing emission limit requirement for medical waste incinerators (MWI) in the existing New Jersey rule. The NJDEP intends to propose a mercury emission limit of 55 ug/dscm for medical waste incinerators which is more stringent than EPA's 550 ug/dscm standard. This emission level is consistent with the New England Governors/Eastern Canadian Premiers' Mercury Action Plan and standards adopted by several northeast states. Also, stack test results show that 55 ug/dscm limit is being achieved. Currently, there are seven MWI facilities in New Jersey, including hospitals and research facilities. Not all of these facilities are operating. Adopting a limit will prevent backsliding and help provide an example to other jurisdictions.

### Iron and Steel Foundries and Mills

In New Jersey, there are six iron and steel melting facilities, which are the largest mercury emitting source category in the state. There is no emission limit in the existing New Jersey mercury rule for these facilities. Stack tests conducted pursuant to permit conditions at five of the facilities indicate that total mercury emissions are in the range of 1000 pounds per year. Mercury emissions concentrations for iron and steel production are in the range 10 to 100 ug/dscm. Mercury Task Force Report recommended a 75% overall mercury emission reduction. Analogous to New Jersey's Municipal Waste Incinerator rules, a performance standard for iron and steel manufacturers will be designed to reduce mercury emissions through a combination of aggressive pollution prevention, source separation, and available controls.

The three cupola and three electric arc furnaces in NJ melt scrap, which includes recycled metals from the shredding of motor vehicles, home appliances, and waste metals from demolished building structures. Thermostats, relays, switches, control devices, and measuring devices contain mercury and find its way into this metallic scrap.

Reducing mercury emissions from iron and steel manufacturers will undoubtedly require a multi-media, multi-sector pollution prevention approach, including removal of mercury from feedstock scrap. Such removal will necessitate: 1) elimination of mercury-added parts from new cars; and 2) removal of mercury switches from existing cars when they are dismantled or prior to shredding. Scrap management becomes the focus of source reduction efforts.

The three facilities that produce steel by melting scrap in electric arc furnaces are operating with baghouses for particulate control. Three other facilities produce cast iron from melting scrap in cupolas. Two of these units are operating with scrubbers and one unit at U.S. Pipe and Foundry operates with a baghouse. Iron and steel furnaces with baghouses could use carbon injection to significantly reduce mercury emissions, as was done with the MSW incinerators. Air pollution controls at iron and steel manufacturing facilities may be necessary in addition to mercury separation from the scrap. The current use of baghouse air pollution control devices on one of the cupola furnaces and all three of the electric arc furnaces makes carbon injection a relatively low capital cost option for four of the six facilities. The two cupola furnaces with scrubbers would need to rely on scrap management or evaluate measures to remove mercury switches, or both. Scrubbers

do remove some forms of mercury, but are less effective than carbon injection with baghouses. Measures to oxidize mercury prior to a scrubber would substantively increase the mercury removal effectiveness of scrubbers. Removal of mercury from the scrubber residue and liquor would be needed.

Prior to implementation of additional control, iron and steel manufacturers, auto dismantlers, and scrap processors are being provided with time to work with auto manufacturers to develop cooperative programs to reduce mercury in scrap. In two USEPA regions (Region 2 and Region 5), a "bounty" program for mercury is under discussion, based on the premise that if mercury had greater value it would be removed from scrap before ever reaching the smelters. Such a bounty, to be paid to dismantlers or shredders, could be funded by the auto manufacturers and/or iron and steel manufacturers.

Recovery and recycling or retirement of mercury in vehicles will be greatly facilitated by designation of mercury-containing switches as Universal Waste in New Jersey and other states participating in a bounty program. Because non-mercury-containing replacement switches are readily available for vehicle convenience lighting, state government and other fleet operators could replace mercury switches while cars are still in service. Purchasing specifications for new cars could require that mercury switches be exchanged for non-mercury switches before cars are delivered.

The Mercury Task Force Report recommends that NJ consider banning the sale of vehicles containing mercury products; designate mercury switches as a Universal Waste in New Jersey. Require testing of carbon injection to determine its effectiveness for iron cupolas and steel furnaces. Where scrubbers are used, require testing of effectiveness and measures to improve effectiveness. Require periodic stack testing with the frequency depending upon the mercury emission level. Educate auto dismantlers, shredders, fleet managers, vehicle service facilities, and other relevant audiences about the importance of removing mercury from vehicles before they are processed into scrap. Determine through measurements whether scrap processing operations including shredding release significant quantities of mercury to the environment. A scrap management plan, which involves pollution prevention upstream of the iron and steel plants, may substantially reduce mercury emissions from iron and steel production. Separation of mercury containing waste materials from scrap management could significantly lower iron and steel mercury emissions, perhaps by greater amounts.

The rule is expected to promote source separation by providing three years from 2001 for source separation to achieve the mercury limit. If this does not succeed, installation of control would be required two years later. The requirements would include quarterly reporting of the facility's efforts to minimize emissions, including how much mercury has been removed from the feed scrap. Technology to specifically reduce mercury emissions has yet to be applied to iron and steel melting operations. The industry is working with scrap suppliers to reduce mercury in scrap. The industry has recommended these auto and appliance manufacturers fund mercury in scrap removal program. Legislation is being prepared to do this. The rules will be proposed to set specific limits on emissions.

## **D.5. Radioactive Municipal Solid Waste**

New Jersey participates in the U.S Department of Transportation (U.S. DOT) exemption (DOT exemption) program through the Conference of Radiation Control Program Directors (CRCPD) to allow the transportation of contaminated trash (CT). As a result, it assists the Waste Industry and reduces the potential for a contamination event that could adversely impact on the health of the people, the environment and commerce in New Jersey.

Almost all the incidents involving CT includes waste contaminated with radioactive material from patients whom have undergone a nuclear medicine procedure. Radioactive materials used in nuclear medicine procedures typically have half-lives of hours to about a week and almost always less than 300 days. Soiled diapers, urinary catheters and bags are examples of such trash. Therefore, the probability of long-term consequences resulting from these CT incidents is minimal.

Incidents involving radioactive materials with longer half-lives occur at metal recycling facilities. Typical half-lives for these radionuclides ranges from 30 to 600 years. Items such as nuclear gauges, radium dials, and smoke detectors are included in this category. A CT incident involving these radionuclides poses more of a significant health and environment risk.

A radiation level of greater than .05 milli-roentgen per hour ( $>.05\text{mR/hr}$ ) qualifies the trash as CT, which triggers notification to the Department and issuance of a DOT exemption for CT. No DOT exemption can be issued for radiation levels equal to or exceeding 50 milli-roentgen ( $>50\text{mR/hr}$ ).

If a transporter refuses to comply with the Department's regulations and DOT exemption or leaves while waiting for approval of the DOT exemption, then SHWE and all parties normally informed in the DOT exemption process shall be contacted and informed that the carrier is in violation of U.S. DOT regulations. The incident will be reported to the U.S. DOT and the New Jersey State Police.

The Radiation Protection Programs (RPP) investigate actual or suspected sources of radiation for the determination of any possible radiation hazards. However, the level of response will depend on the radiation hazards involved, the origin of the radioactive source and other factors depending on the situation